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imposing and at the same time picturesque. Its trunk, with its deeply furrowed, light-coloured bark, possessing that strength and massiveness of character necessary to support the thick and spreading limbs which form its lofty and, almost invariably, well-balanced head

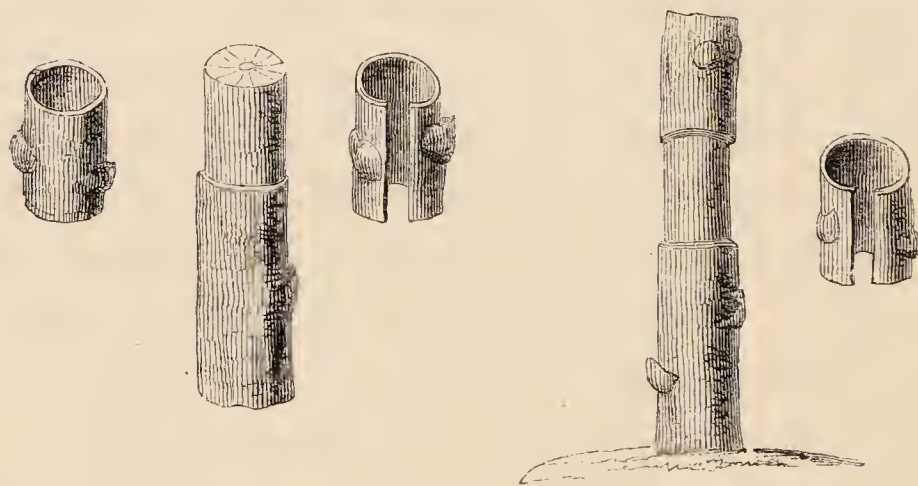
Its foliage, like that of most pinnate-leaved trees, is graceful and light, and its bright yellowish green contrasts well with trees of a darker shade. The principal, indeed, the only objection to it, is the short period it remains in leaf, the foliage not being expanded before the season is far advanced, and cast off with the first autumnal frosts ; this deficiency is, however, in a degree, compensated by its ramification, which, as Gilpin observes, is generally beautiful.

The form and growth of the Walnut, which indicates great power and strength of resistance to the elements, and the enormous and deeply-penetrating roots it is provided with, evidently mark it as an unsocial tree, impatient of interference, and requiring ample room for its full developement. On this account it is ill-calculated for mixed plantations or close groves, but should be cultivated singly, or planted at distances of not less than thirty or forty feet apart. It is, therefore, well-adapted for a park tree, the hedgerow, and as a wayside tree, in which latter capacity it abounds in Switzerland, France, Germany, and other parts of the European continent.

The species is propagated by the nut, which, in cases where the tree is intended as an ornamental feature or for timber, had better be sown in the place where it is intended to remain, as the tap root, which in the young plant is very large, thus remains uninjured, and the plant escapes that check which must always, to a greater or less degree, attend the act of transplantation.*

* It may, however, with care and attention, be planted successfully, when of a considerable size.

The varieties, propagated chiefly for their fruit, are increased by budding, grafting, and sometimes by layering. These operations, in our climate, are uncertain and often fail, though this may probably arise from being performed either at an improper season, or without the necessary care and attention. Indeed, the success that the late T. A. Knight, Esq. had in grafting the Walnut* would lead us to think that such was generally the case, as out of twenty-eight instances of grafting, no less than twenty-two succeeded. In this experiment, both the scions and stocks of the last year's wood were employed, and these were allowed to unfold their buds and grow a few days before the operation took place; the saddle mode of grafting was that made use of. The most approved and successful mode of budding, and which is the one chiefly adopted upon the Continent, is that called the *flute* method, in performing which an entire ring of bark, containing one or more buds, is exactly fitted to the upper extremity



of the stock, which is also denuded of its bark; should the stock be larger than the ring containing the buds, the ring requires to be slit up, but, if this exceeds the stock, then a small portion requires to be cut out, so as to make it fit, as shown in the accompanying figures. Mr.

* See Horticultural Society's Transactions, ser. 2. vol. i. p. 216.

Knight, also, invariably succeeded in budding the Walnut, by using the minute buds that are found at the base of the annual shoots of this tree, and which, as he says, “are almost concealed in the bark, and which rarely, if ever, vegetate, but in the event of the destruction of the large prominent buds which occupy the middle and opposite ends of the annual wood.” These he inserted on yearling stocks which grew in pots, whose vegetation had been retarded by being kept during the spring and early summer in a cold northern exposure, until the small buds above mentioned were formed on the current year’s shoots of the trees intended to be propagated, when the pots containing the young plants were “brought into a forcing-house and there budded.”

No tree requires less pruning, from its earliest age to its full developement, than the Walnut, and, except for the shortening of over rampant and ill-balanced branches, the knife ought never to be used; close pruning, or abscision by the stem, is invariably injurious, and we have repeatedly observed, when this has been done, that a decay, to a greater or less extent, always took place at the lower edge of the wound, in consequence of its slow cicatrization, and the spongy nature of the young wood.

The soil in which the Walnut luxuriates and attains its greatest dimensions is that of a deep, stiffish, dry-bottomed loam, but it thrives in various others, provided they are free from stagnant moisture. Loudon says “the fruit has the best flavour and produces most oil, when the trees grow on calcareous soils or among calcareous rocks.”

In addition to the statistics of the Walnut contained in the “Arboretum Britannicum,” we may mention one at Dunstan Hill, near Newcastle-on-Tyne, with a circum-

ference of trunk nine feet two inches, at one foot from the ground.

The specific characters of the Common Walnut are



leaflets from five to nine, but generally seven in a leaf, glabrous, obscurely serrated, and of an oval form. Nut oval and rather even.

The aments or male catkins, and female flowers appear in the south of England in April and May; in the north, rarely before the end of the latter month.

Few insects appear to feed upon the foliage of the Walnut; and, of lepidopterous larvæ, we have only detected that of *Biston betularius*, and of another small species of geometra, upon the trees in our premises.

The most approved varieties, for their fruit, appear to be the following :—

Jug. r. maxima, with fruit double the size of that of the species. The nuts ought to be eaten in a fresh state, as the kernels shrink up to half their size, when dried. The leaves of this kind are very large, and the tree is highly ornamental, but its timber is inferior to that of the Common Walnut.

Jug. r. serotina. Where frosts continue late in spring this is a valuable kind, as it does not come into leaf before the end of June, and yet the fruit ripens nearly as early as that of the other varieties.

Jug. r. tenera, Thin-shelled Walnut. The nuts of this variety have a very thin, tender shell, are fine flavoured, keep longer, and produce more oil than any other kind; but the trees are generally less prolific. The names of several other less approved varieties may be obtained from the *Bon Jardinier* and the fruit catalogue of the Horticultural Society.

None of the American Walnuts, or hickory trees, have been long enough introduced, or planted to such an extent in England, as to entitle them to a place in the present work. Most of them produce valuable timber, particularly the *Juglans nigra*, American Walnut, a considerable quantity of which is now imported into Britain.

*Nat. Ord. Salicaceæ.*Genus *Salix*, LINN.LINN. *Syst. Diœcia*
Diandria.

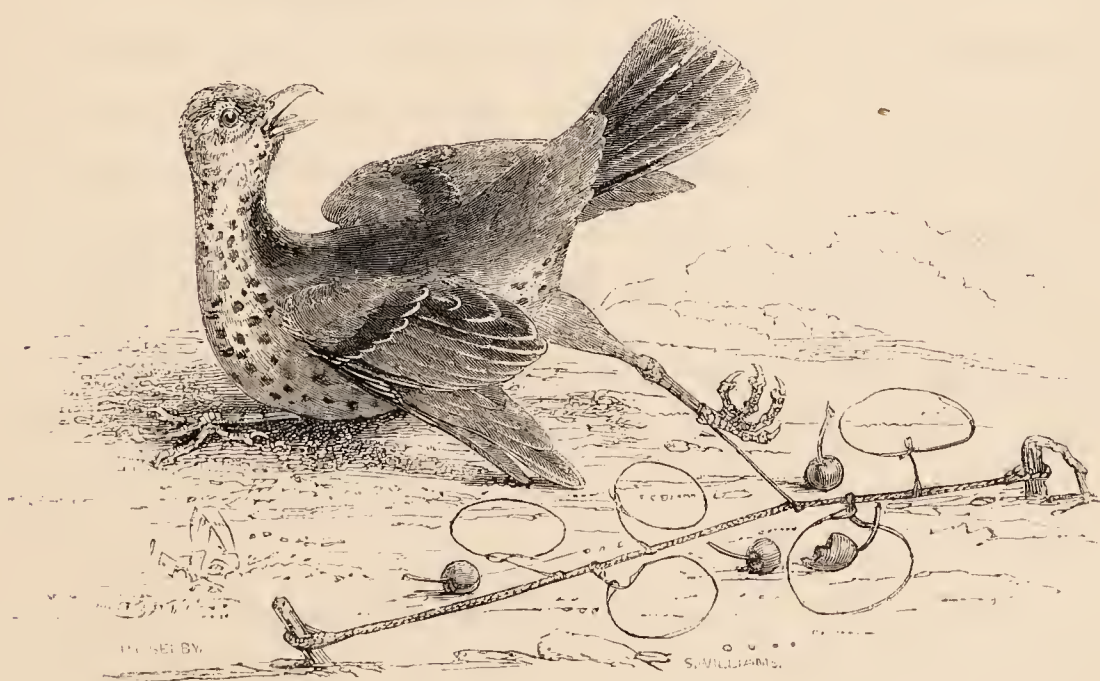
THE WILLOW.

OF this very extensive, and, to the botanist, difficult and puzzling genus, the only British species admissible into the present work, being such as attain the size of trees of the first and second ranks, and produce valuable timber, appear to be the four following :—1st. *Salix fragilis*, Crack, or Red wood Willow ; 2nd. *Salix Russelliana*, Duke of Bedford's Willow ; 3rd. *Sal. alba*, White-tree, or Huntingdon Willow ; and, 4th., *Sal. caprea*, the Goat-Willow, or Saugh. The two first of these belong to Borrer's 5th group, or *Fragiles*, as exemplified in Loudon's "Arboretum Britannicum ;" the third to the 6th group, or *Albæ*, of Borrer ; and the fourth to the 16th group, *Cinereæ*, of the same author. We might perhaps be justified in adding that beautiful exotic species, introduced, it is supposed, upwards of a century ago, the *Salix Babylonica*, Weeping Willow, which, under favourable circumstances, in the southern and midland parts of England, attains a considerable size, or that of a tree of the second magnitude ; but, as it is only cultivated for its ornamental and classic effect in landscape and picturesque gardening, and not for its timber, which is valueless, we have omitted it in our list. Of the other British species, amounting, according

to some botanical authors, to nearly seventy, while others reduce them to about thirty, a few, when trained and attended to in their growth, reach the size of small trees of from twenty to thirty feet high; such are *Sal. triandra*, *Sal. pentandra*, *Sal. acutifolia*, &c.; the majority, however, are of humble growth, and under the name of osiers are valuable when cultivated, producing the material used in the fabrication of all kinds of basket and wicker-work.*

The generic characters are, flowers of each sex with entire bracteas. Male flower generally consisting of 1—5 stamens, sometimes more, with one or more glands inserted contiguously to the stamens. Female flower, a pistil stalked, or sessile with one or more glands inserted contiguously to it. Leaves in most species, with the disk more or less lanceolate.

* For further information respecting this interesting genus, the uses to which the species are applied, their culture, &c., we must refer our readers to the “Arboretum Britannicum,” where they will find a comprehensive digest of all that has been written upon the subject.





Salix fragilis. LINN.

THE CRACK, OR RED-WOOD WILLOW.

Salix fragilis,

LINN. sp. pl. 1448.

SMITH'S Eng. Flor. 4. p. 185.

HOOKE'S Brit. Flo. p. 421. ed. III.

MACKAY'S Flo. Hibern. p. 246.

ON referring to the botanical and arboricultural writers who have treated of this tree, we find a remarkable discrepancy of opinion existing among them, as to the quality

and properties of its timber. By Sir J. E. Smith, in the "English Flora," its wood is stated to be of little value, and that whatever economical or medical uses have been attributed to it, belong to another species (*S. Russelliana*). On the other hand, Mr. Matthew, in his able treatise on naval timber, asserts its excellence and the valuable properties it possesses for this specific and important purpose : "the use (he says,) of the Red-wood Willow as timbers of vessels has been of long standing in this part of Scotland,* and has proved its endurance and excellent adaptation ;" and, he further adds, "by reason of its lightness, pliancy, elasticity, and toughness, it is, we think, the best without exception for the formation of small, fast-sailing war vessels." This high estimate of the wood of the *Salix fragilis*, coming as it does from one who has seen its properties tested and had experience of its value, outweighs, in our opinion, that of the scientific botanist, who probably had never personally examined, or made trial of its qualities, but had taken, without further inquiry and as correct, the common opinion entertained in many parts of its worthlessness, the despised withy having generally been left to rot where it grew, without an attempt to ascertain its properties, or, as a timber, to convert it to any useful purpose. Important as it may be in a naval point of view, its timber is not less useful in various other ways ; from the author already quoted we learn that, for the main timbers or roofing of houses, it furnishes a very durable material ; those of a house he mentions formed of it, and which had stood for upwards of a century, were found, with the exception of the outside to the depth of scarcely half-an-inch, perfectly sound, "still fit for any purpose, of a beautiful pink or salmon colour." It is also

* The eastern coast of Perthshire and Bannffshire.

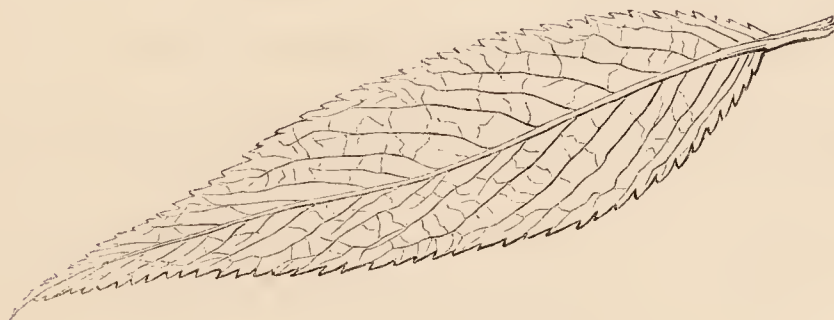
valuable for the repairing of mill wheels, forming excellent wash boards. It also furnishes as good a plank for the lining and bottoms of stone carts, as any other tree of the Willow or Poplar kind; and for all country uses, where a tough, strong, and, at the same time, a light material is required, cannot be surpassed, and we believe, from its grain and colour, it would make very handsome, light, and durable furniture.

This Willow is found distributed throughout the greater part of Britain, but more prevalent in some parts than others. It flourishes upon the banks of rivers, canals, and ditches, and seems to affect a soil rather stiff than otherwise, and we have seen it attain a very considerable size upon cold, damp, clayey soils. On this account we recommend it, if wanted for its timber, to be planted as a hedge-row tree, and also in belts and plantations in upland districts, where the soil is stiff and of moderate quality, as it is likely with some of its congeners to become valuable, both for the shelter and timber it affords, long before the ash, elm, or any other of the slower-growing trees would attain the size of ordinary poles. In its foliage it bears a strong resemblance to the *Sal. Russelliana*, but its growth is different, the ramification being more oblique and the branches in consequence rather crossing each other. It is also less beautiful and imposing in appearance, and seldom attains so great a size. It is very subject to become naked or stag-headed, by the decease of its uppermost branches, though it continues to live, and throw out long annual shoots for many years afterwards; this renders it unsightly, and, as an ornamental species, very inferior to the *Sal. Russelliana*, or the *Sal. alba*. The cause of this canker, analogous apparently to that which attacks so many of our apple and pear trees, has not been satis-

factorily ascertained, and it is still a matter of conjecture whether it is to be attributed to the soil, or to an inherent taint in the slips or cuttings by which it is usually propagated.

When first cut the sap wood of the Crack Willow is white, the heart pale red ; upon exposure to the air, and when seasoned, both become of a fine salmon colour. The bark is bitter and contains a large proportion of tannin, as well as a bitter principle termed salacine, akin in its properties to quinine. The roots afford a purple red dye, and are still used in Sweden and in France to colour the Paschal or Easter eggs, a use to which they were also formerly applied in Scotland.

The larvæ of several nocturnal lepidoptera feed upon the leaves of this as well as other willows ; among them we have found those of *Cerura vinula*, *Notodonta ziczac*, and *Smerinthus populi*.





Salix Russelliana. SMITH.

RUSSELL, OR DUKE OF BEDFORD'S WILLOW.

Salix Russelliana,

SMITH'S Flo. Brit. 1045. Id. Eng. Flor. v. 4. p. 186.

FORBES in Sal. Wob. No. 28.

HOOKE'S Br. Flo. p. 421. ed. III.

MACKAY'S Flor. Hibern. p. 246.

LOUDON'S Arb. Brit. ch. ciii. p. 1517.

THE specific characters of this Willow, as given by botanical authors, are as follows. Leaves lanceolate, tapering at each end, serrated throughout, and very glabrous.

Footstalks glandular or leafy. Ovary tapering, stalked, longer than the bracteas. Style as long as the stigma.

The male, according to Dr. Johnston, has the catkins two inches long, on short leafy branchlets, cylindrical, yellow, diandrous, the filaments not much longer than the pointed, more or less villose scales.

With a foliage considerably resembling that of *Sal. fragilis*, but lighter and more airy in appearance, the Bedford Willow exhibits, when fully grown, a much freer and finer outline, in consequence of the different or more obtuse angle at which its branches issue from the stem. It is a tree of very rapid growth, nearly equalling in that respect the *Sal. alba*, and attains in favourable soils a size superior to that of *Sal. fragilis*. Of the specimens mentioned by authors, the favourite tree of Dr. Johnson, belonging to this species and growing near Lichfield, appears to have been one of the largest, and in 1812, a few months previous to the first injuries it received from the elements, its dimensions were as follow : girth at six feet from the ground twenty-one feet, the length of the stem below the ramification which formed the enormous head, twenty feet ; three years afterwards it had lost the greater part of its boughs, and in 1829 it was blown down by a violent storm, which took place on the 29th of the April of that year. We lately measured a tree of this species growing at Dunstan Hill, near Newcastle-on-Tyne, ten feet in circumference at the base ; but the length of the stem is not more than eight feet, at which height three or four



enormous limbs branch out and form a lofty and wide-extended head.

The Bedford Willow appears formerly to have been confounded with the *Sal. fragilis*, or considered as a variety of that species, and it was not till the commencement of the present century that its distinctive characters were pointed out, and the appropriate name of *Russelliana* given to it, the late Francis, Duke of Bedford having been the first to bring it into notice, and point out the valuable properties it possesses as a timber tree.

The wood of the Bedford Willow is of a quality fully equal to that of *Sal. alba*, being tough, elastic, and durable, though perhaps not more so than that of *Sal. fragilis*, which species, however, it generally exceeds in scantling, when grown together upon ground of the same quality. It forms strong and durable joists and main timbers for buildings, and makes an excellent flooring for manufactories, &c., not splitting by any sudden shock, and, like the wood of the poplars, being of slow combustion and difficult to set on fire. Its tough and strong lateral adhesion makes it an excellent lining for stone carts and barrows, and, in the neighbourhood of stone and lime quarries, we have known the wood of this and the White Willow to sell at as high a price as five shillings per cubic foot.

It thrives and attains its greatest developement in a moist soil of good quality, but not where water is stagnant. It also produces good timber and of a tolerable scantling upon inferior and clayey soils, and is by no means of a tender or delicate constitution. It is, therefore, a profitable tree to plant upon exposed uplands in company with *Sal. alba*, *Sal. fragilis*, and other trees, and we strongly recommend it as certain to make a speedy and

profitable return to the planter. When grown in company, or planted in mass, the side branches are kept small, and do not interfere with the growth of the main stem of the tree ; it therefore runs up to a great height, with a clean straight trunk, and is thus rendered fit for many purposes to which, when grown as a single or hedgerow tree, it is seldom applicable. At Twizell, about sixteen years planted, it is upwards of forty feet high, with a straight stem, measuring three feet ten inches in circumference at one foot from the ground. At Tallowden, the seat of General Sir H. Grey, there are some fine examples of this tree, averaging upwards of sixty feet in height, and about eight feet in girth.

From experiments that have been instituted, it appears that the bark of the Bedford Willow contains, in a given quantity, a greater proportion of tannin than that of the oak ; this ought to render it as valuable to the tanner as the bark of that tree, but we do not find that it is much sought after or in demand, at least such is the case in the north of England. This, however, may arise from its superiority not being generally known to the trade, though we apprehend that a mistaken prejudice, and an unwillingness to make trial of a new material, (however good it may be,) because it is new, may have their effect in preventing its general application. Most of the insects and larvæ which feed upon the *Sal. alba* are also found upon this tree.



Salix alba. LINN.

WHITE, OR COMMON HUNTINGDON WILLOW.

Salix alba,

LINN. sp. pl. 1449.

SMITH'S Eng. Bot. 1230. Id. Eng. Flo. v. 4. p. 231.

FORBES in Sal. Wob. No. 136.

HOOKE'S Brit. Flo. ed. III.

MACKAY'S Flo. Hibern. p. I. p. 247.

LOUDON'S Arb. Brit. ch. ciii. p. 1522.

IN this species the leaves are lanceolate, serrated, the lower serratures bearing glandules, both sides covered with adpressed silky hairs, giving the foliage a whitish appear-

ance. Stamens hairy, two to a flower, the ovary glabrous, flowers loosely disposed in the catkin. This species, which may justly be considered the finest, and perhaps the most elegant of the tree Willows, grows naturally to a very great size, with an outline, very frequently, of imposing elegance and picturesque effect, and which, as Gilpin observes, fits it to appear in any rural scene. Such is its effect where it is left to its free growth, and where the disfiguring custom of pollarding, so common in the fenny parts of England, is either unknown or rarely practised. In the north of England and Scotland, where mineral fuel is cheap and plentiful, and no necessity exists for the trimming and pollarding system, very fine examples of this tree are often met with, and, when growing in an appropriate situation, such as on the banks of a river, the margin of a purling brook, or in one of our low, sheltered, and sunny haughs, it forms a beautiful and interesting feature, its silvery and plume-like foliage giving an air of lightness and grace to the landscape, and producing, by its contrast with foliage of a deeper tint, that effect so agreeable to those who view such scenes with the eye and feeling of an artist.



Hitherto the *Sal. alba* as well as the *Sal. Russelliana* do not appear to have been cultivated to the extent they so well deserve, considering the value of their produce, and that they make a more rapid and profitable return to the

planter than almost any other tree, the larch always excepted.



The White Willow has also the advantage of thriving, and growing to a large size, upon land of secondary quality, though it no doubt attains its finest developement in a rich moist soil. We have seen it, indeed we have many promising young trees growing rapidly upon a stiffish clay, where it has been well drained of stagnant water. It is therefore well calculated for plantations in poorish upland districts, and we would recommend it, together with the *S. Russelliana*, to be freely inserted where such are made, particularly in hollows near water-courses, or at the bottom of declivities where the soil is moist: thus planted, in company with other trees, or in masses by itself, the Willow makes astonishing progress, and soon reaches a

great height, with a clean straight stem, rendering it fit for a great variety of purposes where length of solid timber or planking is required. Its growth is very rapid, the annual increase of timber in trees of between twenty and thirty years old, having been found to be at the rate of one cubic foot and a half; such appears to be the result of the measurement of five trees at Woburn Abbey, the particulars of which are detailed in the "*Arboretum Britannicum*," and we find that a similar increase took place in willows of this species planted by Mr. Gorrie on the northern bank of the carse of Gowry in Perthshire. At Twizell, in Northumberland, upon soil of moderate quality, being a stiffish loam, its growth has been equally rapid, and we have just measured a tree planted about eighteen years ago, whose height is upwards of fifty feet, with a trunk six feet four inches in circumference at two feet from the ground; others growing near to this individual are loftier, but none of them equal it in girth, the two next being, the one five feet four inches, the other four feet six inches in circumference.

The simple, and at the same time the very cheap mode of propagating the Willow is also another great advantage attending its cultivation, for all that is required to form a plantation is to take cuttings of wood one or two years old from a foot to two or more in length, and plunge them to the depth of eight or ten inches into the soil; stakes also of a larger size, or from six to eight feet long, and from two to three inches in diameter, succeed very well, and are recommended by Mr. Gorrie; but having tried both methods, we prefer the smaller cuttings, and think our finest trees are from these.

As a hedge-row tree the White Willow succeeds very well in low and sheltered districts, attaining a great size,

and presenting the appearance of a wide-spreading tree, the stem seldom reaching to any great height before it divaricates, and throws out great limbs which form the head. In exposed and upland situations it is unable, when planted singly, to resist the force of the prevailing winds, and in consequence generally deviates more or less from the perpendicular, and is liable, in heavy storms of wind, to have its limbs broken or torn from the stem.

The wood of the *Salix alba* is similar in texture and quality to that of *Russelliana*, and adapted for like purposes, making excellent sheathing for stone carts, barrows, &c., and when grown in mass, or in company with other trees, affords clean and durable joists and rafters for buildings; it is also used in mill-work, and by the turner and cooper. At a younger age, or as a coppice wood, it produces hoops, light handles for hay-rakes, hoes, and other implements, and the twigs are used in basket-making and other wicker-work. Willow-wood is also used when split into fine lamina, to weave or work into light hats and bonnets, and the woven material is the foundation upon which the light silk hats, now so generally in use, are moulded.

Its bark contains a large portion of tannin, but is not in great demand or appreciated by the tanner as it would seem to deserve, nor is it used to nearly the same extent in England as it is in other parts of the north of Europe.

In Sweden, and other high latitudes, where the seasons are uncertain, and scarcity is often felt, in consequence of the failure or imperfect ripening of the corn crops, the inner bark of this species, as well as that of the Scotch fir (*Pinus sylvestris*), is frequently made into a bread, being first dried, then ground into a fine flour, and mixed with a certain proportion of oatmeal. Loudon informs

us that in France “a fine blood-red colour is obtained from the bark which is also used in the preparation of leather for making gloves.”

The species is widely spread throughout Europe, possessing a range from Norway to the Mediterranean, and is also a native of the north, east, and west, of Asia.

The foliage of the Willows, and among the rest that of the present species, is the food of the larvæ of numerous lepidopterous, coleopterous, and hymenopterous insects; among those of the Lepidoptera we have observed most of the following, *Smerinthus populi*, and *ocellatus*, *Clostera reclusa*, and *curtula*, *Cerura furcula*, *arcuata*, and *vinula*, *Notodonta ziczac*, *Leiocampa dictæa*, *Leucoma salicis*, *Orthosia sparsa*, and *lota*, *Calyptra libatrix*, *Bombycia viminalis*, *Zanthia aurago*, *Cabera pusaria*, *Cidaria salicata*, &c. The ravages of some larvæ are not, however, confined to the leaves, for the wood itself is bored into and fed upon by the caterpillar of the Goat Moth, (*Cossus ligniperda*), and we have had young trees attacked and *riddled*, as it were, by the grub of the *Cryptorhynchus lapathi*, a coleopterous insect belonging to the Curculionidæ or Weevil tribe, and whose habits and depredations are noticed and accurately described by Mr. W. Curtis, in the 1st. vol. of “The Linnean Society’s Transactions.” At the period of flowering, Willow trees swarm with hosts of honey-bees, and other species belonging to that family, among which the party-coloured and sonorous humble-bees are eminently conspicuous; and when in full foliage they become, from the abundance of insect food they afford, the favourite resort of several of our insectivorous warblers, such as the black-cap (*Curruca atricapilla*), greater pettychaps (*Curruca hortensis*), and those delicate species of the genus *Sylvia*, commonly known by

the name of Willow-wrens; at the same time may be seen the various species of our own native titmice, engaged in eager and prying search, and hanging from the tender spray in every possible attitude. The vignette represents the imago, pupa, and caterpillar of *Smerinthus populi*.





Salix caprea. LINN.

GOAT WILLOW, OR LARGE-LEAVED SALLOW.

Salix caprea,

LINN. sp. pl. 1448.

SMITH'S Eng. Bot. 1488. Id. Eng. Flor. iv. p. 225.

FORBES in Sal. Wob. No. cxxii.

HOOKE'S Br. Flor. p. 429. ed. III.

MACKAY'S Flor. Hibern part I. p. 252.

LOUDON'S Arb. Brit. ch. ciii. p. 1561.

THE present species, in some districts known by the name of the Saugh, is distinguished from all the other Willows by its large ovate, or sometimes orbicular ovate leaves, which are pointed, serrated, and waved on the

margin, beneath they are of a pale glaucous colour, and clothed with down, but dark green above. The stipules are crescent-shaped. The catkins are oval, very numerous, nearly sessile, and are expanded much earlier than the foliage. The ovary is stalked, silky, and ovate in form; the stigmas are undivided and nearly sessile.



The Goat Willow or Saugh, though barely reaching, even under favourable circumstances, the dimensions of a



tree of the second rank, is yet, we think, from the several valuable properties it possesses, of sufficient importance to be admitted within the limits of the present work. In favourable situations, and unmolested in its growth, it

attains a height of from thirty to forty feet, with a trunk from a foot to a foot and a half in diameter. It seldom, however, possesses any considerable length of clean stem, as the branches which form the head, generally begin to divide at a moderate height, and, diverging in different directions, give it the bearing and appearance of a compact, round-headed tree.

The foliage, unless seen directly from above, (when it appears entirely of a deep green,) has, from the mixture of the whitish under surface of the leaves with the deeper green of the upper, a dull glaucous appearance, which we have seen produce a good effect in certain situations and in contrast with the foliage of a different and livelier hue.

It grows in almost all soils and situations, but prefers dry loams, and in such attains its greatest size; and as the female plants are numerous and produce abundance of perfect seed, it propagates itself very extensively throughout the whole of Britain. Our associations as connected with this tree, are all of a pleasing description; it reminds



us, at an early period of the year, when its pure white silky catkins first burst the cerements that enshroud them, that the severity of winter is fast passing away and a milder season approaching. It is also a little later, when those catkins we lately admired for their silvery lustre are now glowing with a golden inflorescence, that we first hear and listen, with pleasurable feelings, beneath its richly-clothed head, to the busy hum of the honey-bee, and to that of its larger and more sonorous relative, the humble-bee, whose resuscitation from a long torpidity we have always been accustomed to hail as a certain indication of the commencement of spring and of a mild and genial temperature.

The wood of the Saugh is of a pinkish white colour, with a fine smooth grain; and, possessing considerable lateral as well as longitudinal adhesion, is tough and elastic. These properties render it applicable and well adapted to various purposes where small-sized wood only is required; thus, it makes good handles for hatchets and other tools, rake-teeth, &c. It also makes light and durable hurdles, which long resist the alternation of moisture and dryness. It is subject, however, to have the lower part of the stem much injured by the galleries or perforations of the larva of the *Trochilium crabroniforme*, (Lunar Hornet Sphinx,) a beautiful lepidopterous insect belonging to the family *Trochilidæ*. Few trees of this species,—to which it seems confined,—escape the ravages of this insect, and out of a great number of trees cut down at various times we scarcely recollect a single instance where the plant had attained a diameter of two or three inches, that had not been perforated by the *Trochilium*. In its perfect state it is rarely met with at large, and most of the specimens we possess have been

obtained from trees that had been cut down, and which were observed to contain the larva or the pupa of the insect. Such pieces as were found to contain these were kept in a large box placed in a dampish situation, and carefully watched till the developement of the perfect insect, which takes place towards the end of June or beginning of July. The following plan has also been adopted with success; this is to surround the lower part of the trunk of growing trees containing the pupa with fine muslin or leno, taking care so to secure the lower and upper ends, that the perfect insects when they come forth cannot escape between the muslin and the bark.

Trees infested with the larvæ are easily detected by the sawdust or abraded wood which is found at the bottom of the trunk, just where it emerges from the ground, and where the larva appears to make its first entrance, which some entomologists suppose is not till the second year of its own age, as the caterpillars and the perforations are all large and nearly of the same size, nor are any borings met with indicative of a small or newly-hatched worm; the supposition, therefore, is, that the caterpillar is hatched about the root of the tree, and for a certain period lives upon the tender bark of the roots, a fact, however, that we have not yet been able satisfactorily to ascertain.

Galleruca caprea, a beetle belonging to the family *Gallerucidæ*, also infests this as well as *Sal. cinerea*, both in its perfect and larva state; and the leaves are also often much injured by the caterpillars of *Nematus caprea*, a four-winged insect belonging to the *Tenthredinidæ*.

The bark of *Sal. caprea* contains a considerable proportion of tannin, and brings the same price as that of the birch and larch, in the north of England and Scotland.

It grows very rapidly for a few years, springing from the

seed, and trees when cut down, often throw up from the stock shoots of four or five feet in length the first year; the leaves of these shoots are very large, and the bark of a rich reddish brown. As an undergrowth it may be cultivated to profit, as its rapid growth quickly furnishes a supply of rods fit for corfs, crates, or basket-making.



Genus *Populus*, TOURNEF.

LINN. *Syst. Diœcia*
Octandria.

THE POPLAR.

THE Poplars are mostly trees of very large size, growing with extraordinary rapidity, and equalling if not surpassing in that respect the large timber-sized willows already described. They are natives of Europe, parts of Asia, the west of Africa, and North America. Their wood is light, of a white or pale yellowish colour, very durable when kept dry, not liable to warp or twist when sawn up, and, from its elasticity, yields without splitting or cracking when struck with violence; that of some species is also very slow in taking fire, and when it is ignited burns in a smouldering manner, without flame, on which account it is valuable and extensively used for the flooring of manufactories and other buildings. The catkins of the male plants of most species are large and very ornamental, the anthers being of a rich purplish red colour; they are produced early in spring and before the bursting forth of the leaves. The seed produced by the females is enveloped in a fine cottony substance, which has sometimes been manufactured into paper and cloth.

The well-known tremulous motion of the leaves proceeds, in the *Pop. tremula* (Aspen), chiefly from the flattening of the footstalk, in other Poplars, from the great length and slenderness of this part in proportion to the weight of the attached leaves, so that they are acted upon and put

in motion by a very slight breath of air. The buds of many species, particularly those of *Pop. balsamifera* and *Pop. Canadensis*, are protected and varnished with a strong but agreeably-scented gummy matter, much sought after by honey-bees, who convert it into the substance called propolis, with which they stop chinks and cement their hives to the boards upon which they stand.

The species delight in a rich, moist soil, or in the neighbourhood of running water, but they do not thrive in marshes or soils saturated with stagnant moisture. Hitherto the male plants only of many exotic kinds have been introduced, so that no opportunity has existed of raising plants from seed; their propagation, therefore, is continued by means of cuttings and layers, and in some species by the suckers thrown up from the superficial roots. Considerable confusion appears to exist in regard to the species and varieties, and these difficulties are not likely to be solved till both sexes of the different kinds have been cultivated together, and their produce tested by experiment; on this account, we shall treat the various kinds to be described, as species, although Loudon deems some of them mere varieties, and even thinks that all the kinds now cultivated in Britain may be referred to and included under the generic heads of *Pop. alba*, *Pop. tremula*, *Pop. nigra*, and *Pop. balsamifera*.

The Poplars afford nourishment, both by their leaves and wood, to a great variety of insects in the larva as well as in the perfect state, but as notice will be taken of those most interesting for their beauty or rarity, when describing the different species, we omit any detailed enumeration of them at present.



Populus canescens. SMITH.

THE GREY, OR COMMON WHITE POPLAR.

Populus canescens, SMITH'S Flor Brit. p. 1080. Id. Eng. Flor. vol. iv. p. 243.
 MICHAUX'S N. Amer. Syl. vol. ii. p. 245.
 LOUDON'S Arb. Brit. ch. ciii. p. 1639.

THE Grey Poplar by many botanists is considered a distinct species; by others it is accounted one of the varieties or forms of the White or Abele Poplar. Which

of these suppositions is the correct one, is not for us to determine, and, indeed, the attempt to do so, with our limited botanical knowledge, would be presumptuous. We therefore only venture to suggest that, if they are only varieties of one species, the original stock is more likely to be the *Pop. canescens* than the *Pop. alba*, the first appearing to have a wider geographical distribution, and to be more generally met with in a wild and indigenous state, than the latter.

It is distinguished from the *Pop. alba* by its leaves, which are less deeply and acutely lobed, and, instead of being covered with the thick, snow-white down which clothes the under surface of the leaves of the *Abele*, the downy substance is sparing and of a grey colour, and, indeed, in some instances, the leaves are almost glabrous. The catkins of the female *Pop. canescens* also are cylindrical instead of oval, and the stigmas eight instead of four. Other characters also are not wanting, such as the growth of the branches, which are more upright and compact in *Pop. canescens*, whose bark is also different in colour from that of *Pop. alba*.



The Grey Poplar attains in favourable situations, such as a loose moist soil on the banks of a river, pond, or like locality, a very large size, frequently running up to the height of eighty or ninety feet, with a diameter of trunk from three to five, and even seven feet.*

* See statistics of this tree in the "Arboretum Britannicum."

When arrived at maturity it presents the appearance of a tree with a wide and spreading head, rather thinly clothed with foliage, and a straight trunk, often clear of branches to the height of thirty or forty feet. It grows with great rapidity, and, as a timber tree, is at its highest state of perfection at the age of fifty or sixty years; for though its existence may be prolonged considerably beyond a century, a decay at the heart or central part of the trunk, usually commences at the age above mentioned.



The Grey Poplar is supposed to be indigenous to Britain, being met with in a wild state at very remote and distant stations; its near relative, the Abele, with which it is frequently confounded, is, on the contrary, said to have been introduced from Flanders, and this seems to be supported by Evelyn's statement of the propagation of the Grey Poplar, where he says, "There is a finer sort of White Poplar, which the Dutch call abeel, and we have of late much of it transported out of Holland."

As an ornamental tree, it is not unworthy of a place in extensive parks and grounds, particularly when planted in low situations, or near to water; it ought, however, to be grouped and massed with trees of equally rapid growth, else it soon becomes disproportionate, and out of keeping with those whose progress is comparatively slow. In

France, and other parts of the Continent, it is extensively used as a wayside tree, for which, Loudon remarks, it is well adapted in a climate like our own, for, growing with a clean trunk, it has no side branches to prevent the admission of light and free circulation of air, both very necessary to the keeping of our highways in a state of good repair. It is also sometimes used to form avenues of approach, and when an effect is wished to be produced in the shortest possible time, answers the purpose perhaps better than any other rapid-growing tree, as its form is often fine, and it carries an ample head. As an avenue tree, however, it is inferior to the elm, beech, lime, and some others, and is, besides, objectionable on account of the numerous suckers it throws up, to a great distance around, and it is, therefore, only in cases where time is considered of great importance, that we recommend it for this purpose.

Hitherto this Poplar, though widely distributed throughout Britain, and long propagated in our nurseries, has never been extensively planted, and rarely in masses together; we are however, of opinion, from its rapid growth, the size it attains, and its clean straight timber, that it would prove a very profitable tree to the planter, in localities where wood of its quality is in demand, such as in manufacturing districts where Poplar and willow wood is used for flooring, machinery, &c.—Plantations composed of it would also have the advantage of furnishing, for an indefinite length of time, a constant succession of timber, as young trees from the suckers would always be in training to replace those annually cut down. It is also well adapted to fill up blanks in young plantations, and we recommend its insertion in narrow belts and strips, where, if not allowed to grow to maturity, it might be kept as

an undergrowth to protect and shelter other trees, and contribute to take away the naked and starved appearance such plantations so generally exhibit.

In cultivating this Poplar in masses, and with a view to produce timber, Loudon recommends the young trees to be planted from fifteen to eighteen feet apart every way: this we consider quite necessary, both on account of its rapid growth and the running nature of its roots, which require space to throw up strong suckers to succeed the first planted trees as they are thinned out; should the soil not be of too moist a nature, the interstices might, when the plantation is first made, be filled with larches, which would yield a crop of useful railing, posts, &c., before the Poplars had reached a timber size.

No tree requires less pruning, even the shortening in of branches is rarely wanted, and large limbs ought never to be amputated, as the wounds readily imbibe the wet, and soon communicate a taint and rot to the trunk of the tree.

The soil most congenial to the nature of the Grey Poplar is a loam near water, but not where the earth is saturated with stagnant moisture. The wood of trees, however, grown in rich moist ground, is more open and spongy in texture than when cultivated upon drier soils, where the species, though it does not make the same rapid advance, thrives very well and attains a large and useful size.

It is propagated by layers, or by suckers thrown up by the roots which run near the surface, and sometimes by cuttings or truncheons, which may be planted any time during the spring months.

The wood is very white, and when dry of a tough nature, allowing nails to be driven into it without splitting,

on which account, and its lightness, it is well adapted for packing-cases; it also affords excellent and durable deals for flooring boards, barn-doors, &c., and by the musical instrument-maker is often substituted for the wood of the lime-tree. In Scotland it is used in mill-work, as well as by the turner and cooper, and for its lightness and smoothness the boards and rollers around which silks and other articles are wrapped, are also made of Poplar wood. In a fresh state it weighs about fifty-eight pounds, the cubic foot, and loses about nineteen in the process of seasoning, as when well dried it is reduced to about thirty-nine pounds.

The leaves of the Grey Poplar are frequently eaten by the caterpillar of *Smerinthus Populi*, and we generally find that of *Clostera reclusa* upon it, as well as others belonging to the *Notodontidæ*.

Towards autumn the foliage is often disfigured by the growth of parasitic plants which abound upon most species of this genus, and *Polyporus ignarius* and other large fungi are frequently seen upon the stools and decaying trunks of this tree.

At Twizell, about eighteen years planted, the Grey Poplar is nearly fifty feet high, the circumference of the trunk, at two feet from the ground, three feet. At Falloowden, the seat of General Sir H. Grey, there is a picturesque tree, nine feet seven inches in girth.



Populus alba. LINN.

WHITE POPLAR, OR ABELE TREE.

Populus alba,

LINN. sp. pl. 1463.

SMITH'S Eng. Bot. 623. t. xvi. Id. Eng. Flor. iv. p. 243.

HOOKE'S Br. Flor. p. 432. ed. II.

MACKAY'S Flor. Hibern. part. I. p. 254.

Provincial. Dutch Beech, Great White Poplar.

NEARLY as this tree is allied to the foregoing species, we deem it most prudent under the circumstances of uncertainty in which the genus is involved, to follow the

opinion of Sir J. E. Smith, and other botanists, and to treat it as distinct.

In the specific characters assigned to the *Pop. canescens*, the stigmas are stated to be eight; in the *Pop. alba* they are only four in number; the catkins of the female of *Pop. alba*, instead of being cylindrical, are ovate. The leaves are lobed and toothed, in young plants almost palmate, and covered with a thick snow-white down beneath, the upper surface being dark green and smooth. The branches are white, and when young thickly covered with down, and in their growth more horizontal and spreading than in *Pop. canescens*. It grows rapidly, and frequently to as great a size as the Grey Poplar, flourishing best in a rich moist soil, though we have seen it of large dimensions in dryish situations.

It is a native of Europe, and widely dispersed upon the Continent, though perhaps not indigenous to Britain, but first introduced from Flanders or Holland, where it abounds and is extensively cultivated.

The wood of this species is not of so good a quality as that of the Grey Poplar, being softer and more spongy in texture: it may, however, be applied to many similar purposes, but upon the whole, both as an ornamental and profitable tree, we consider it decidedly inferior to the other. In certain situations the contrast produced by the snowy whiteness of its leaves when agitated by the wind, with foliage of a darker hue, has a peculiar and sparkling effect, and it is, therefore, a tree that may occasionally be successfully introduced in landscape gardening. Some of its varieties, also, such as *Pop. acerifolia*, and *Pop. tomentosa*, the Maple-leaved and Hoary Poplar of the nurseries, distinguished by larger and more palmate-shaped leaves, and with even a greater degree of snowy

whiteness, are worth cultivating for their appearance. The *Pop. Egyptiaca*, which Loudon supposes a variety of *Pop. alba*, appears, from the plants we possess, to be very different in character, and more likely to belong to *Pop. nigra*, or else to the group to which the Lombardy Poplar (*Pop. fastigiata*), belongs.





Populus tremula. LINN.

THE ASPEN, OR TREMBLING POPLAR.

Pop. tremula

LINN. sp. pl. 1464.

SMITH'S Eng. Bot. p. 1909. Id. Eng. Flor. vol. iv. p. 244.

HOOKE'S Flor. Scot. p. 289.

MACKAY'S Flor. Hibern. part 1. p. 254.

JOHNSTON'S Flor. of Ber. 1. p. 219.

LOUDON'S Arb. Brit. vol. i. ch. ciii. p. 1645.

THE following are the chief specific or distinguishing characters of this tree according to Smith and Hooker. Leaves nearly orbicular, broadly toothed, glabrous on

both sides, petioles compressed, young branches hairy, stigmas four, erect and auricled at the base.

For elegance and beauty of form, the Aspen, when grown in a favourable soil and where nothing has interfered with its developement, is inferior to few of its tribe, presenting the appearance of a tall and, in proportion to its height, rather a slender tree, with a clean straight stem, the head ample and formed of horizontal growing branches, not crowded together, and

which, as the tree acquires age, assume, towards the extremities, a drooping or pendulous direction. The foliage is of a fine rich green, and the upper surface of the leaves being somewhat darker than the under, a sparkling and peculiar effect is produced by the almost constant tremulous motion with which they



are affected by the slightest breath of air, and which is produced by the peculiar form of the foot-stalks, which in this species is flattened, or vertically compressed in relation to the plane of the leaf, causing a quivering or double lateral motion, instead of the usual waving motion, where the footstalk is round, or else compressed horizontally.

On the margins of woods in a rich moist soil, and where it has had sufficient room and air to acquire its full developement, we have often admired the effect produced by the Aspen in combination or in contrast with the

foliage of other trees; it is also frequently an interesting object on the wooded slopes of highland scenery, and in Scotland adorns the margins and hanging woods of its most interesting and beautiful lochs. Upon Loch Katrine it mingles with the birch, and clothes, almost to the exclusion of other trees, the classic islet of the Lady of the Lake.

It is indigenous to Britain, being found throughout England in moist woods and damp situations, and in Scotland it extends as far north as the borders of Sutherland. In Aberdeenshire, near Braemar in the woods of Invercauld, it grows at an elevation of sixteen hundred feet, and we have seen it as high in different parts of Argyleshire. In Ireland, according to Mackay, it is found native in the County of Dublin, and several other districts. Upon the European continent its distribution extends over the southern as well as the northern parts, nearly to the verge of the Frozen Ocean; in Russia, Loudon states it to be very abundant, particularly in the woods around Moscow, and he mentions the interesting fact that in the year 1813, the year following the burning of that ancient city, innumerable seedling plants of the Aspen sprang up in every direction among the ruins, no doubt from seed that had been wafted thither by the wind from the neighbouring woods. It is also a native of Asia Minor, and the whole of the Caucasian range. If it were not for the innumerable suckers thrown up to a great distance by this tree, its ornamental properties would claim a more extensive cultivation in landscape scenery than it has hitherto received, but this disadvantage is of so serious a nature in pleasure-grounds, lawns, and meadows, that it must always be sparingly introduced in such situations; the objection, however, does not extend to large woods, or

wooded slopes in upland districts, where it might be planted to advantage in the moister parts, as it grows rapidly and soon attains a profitable size.

The wood is white, light, and rather tender, but well adapted for the staves of herring-casks, milk-pails, &c. It is also employed by turners, and, cutting clean and sweetly with the chisel, is adapted for carving in wood; it is also applicable to various purposes in house carpentry, provided it be kept dry, but in this respect is much inferior to the wood of the Grey and the Black Italian Poplars. The bark contains a considerable percentage of tannin, and is used, with that of other species, by the tanner, and it was the favourite food of the beaver when that animal abounded in the north of Europe. It is sometimes used as a vermifuge for horses, and in some countries is a domestic medicine for scorbutic and other cases.

Unlike many of its congeners, the wood of the Aspen burns with a clear flame, but gives out very little heat; its value as a fuel, compared with the beech, being, according to Loudon, as 970 to 1540.

The spray and leaves are greedily eaten by deer, goats, sheep, and other herbivorous quadrupeds, and in countries where hay and fodder are scarce, the young shoots and leaves are cut and dried for winter food.

The soil in which it grows most luxuriantly is a moist loam, but as the roots run near the surface it does not require it to be deep. In such situations, planted in mass at six or eight feet distance, it will, in the course of twelve or fourteen years, make a profitable return, as at that age it will be of sufficient size to saw up into herring-barrel staves, for which at present there is so great a demand. It attains perfection in fifty or sixty years, after which it begins to decay at the heart. At this age it has fre-

quently reached a height of seventy or eighty feet, with a diameter of three or four feet.* In dry soils the Aspen never reaches a great size, though it lives many years, and the wood is of good quality.

It is easily propagated by the suckers, which are thrown up in great abundance, as well as by the cuttings of the roots, which succeed better than those taken from the branches of the tree. Young seedlings are also abundant in all woods where it grows, and these are perhaps preferable to plants raised by the other methods we have named.

The leaves are eaten by the caterpillars of many nocturnal Lepidoptera, as by that of *Cerura vinula*, *Noto-donta ziczac*, &c., and by many of the Chrysomelidæ, among which *Phaëdon vitulina*, is sometimes very numerous.

The red warty-looking excrescences upon the leaves and leaf-stalks are produced by wounds inflicted by the ovipositor of a tipula which selects these parts as depositories for its eggs.

In some countries curious superstitions existed, and indeed still exist, respecting the Aspen, originating from the constant tremulous motion of the leaves; thus, by the Highlanders it is supposed to be the wood of



* See the statistics of the Aspen in Loudon's "Arboretum Britannicum."

which the holy cross of Christ was made, and on this account they believe its leaves can never more remain at rest. Its peculiar quivering motion has also frequently arrested the attention of the poet, and many allusions to it are made by modern writers, among which none is more beautiful than the well-known lines in *Marmion* :—



“ Oh ! woman, in our hours of ease,
Uncertain, coy, and hard to please,
And variable as the shade
By the light quivering Aspen made ;
When pain and anguish wring the brow,
A ministering angel thou ! ”

The vignette represents one of the Aspens growing upon the Lady's Islet, in Loch Katrine. Our figure from a tree growing at Twizell.





As a species nearly allied to the Aspen, but as an ornamental tree superior to it in many respects, we deem the *Populus Græca* of Aiton, and other writers, worthy of a few remarks.

The specific term of *Græca*, and classic appellation of *Athenian Poplar*, naturally lead to the supposition that this species is indigenous to Greece, and that it derives its name from the city of Minerva ; such an opinion we entertained in common we believe with many others, and even botanical writers gave weight and currency to

the supposition, as Willdenow records it in his "*Species Plantarum*" as a native of the islands of the Archipelago. It appears, however, from the account contained in the "*Nov. du Hamel*," and from other evidence, that the North American Continent is its real native country, and that growing abundantly in a particular township called Athens, it received from it the imposing and euphonious title of Athenian Poplar. This origin Loudon thinks the more probable from the circumstance of its having been first introduced by Hugh, Duke of Northumberland, who served in America during the colonial war, and imported from thence a great variety of American trees, many of which now adorn the grounds at Sion House, and Alnwick Castle, at which latter place the original tree from whence our own plants and those disseminated in the north of England are derived, was first planted. It is a tree of handsome appearance, with a stem rather slender in proportion to its height. The bark, until the



trees become of a considerable size and age, is very smooth, and of a pale greenish grey colour, and the leaves which are roundish-ovate in shape and terminate in a sharp point, are of a pleasant, deep, and rather glaucous green; they expand early in spring, immediately succeeding those of the Balsam Poplar, and have the advantage of being retained till a late period in autumn. The catkins are shorter than those of the Aspen, and come out at a much earlier period.



It grows rapidly, young trees often making shoots in one season of five or six feet in length, and, though a slender-stemmed tree, has the valuable property of resisting the wind, and is never seen, even in the most exposed situations, but with an erect and perpendicular trunk.

The same objection, however, attends the cultivation of this species, as that of the Aspen, viz., the throwing up of numerous suckers from the surface roots, and on this account its cultivation as an ornamental tree must always be limited, and of the propriety of planting it in mass with a view to profit, in outlying situations, we cannot venture an opinion, having had but little experience of the properties and qualities of the wood.

It is readily propagated by the suckers it throws up, and by layers, being one of the few belonging to the genus that does not not succeed by cuttings. The leaves are a favourite food of the caterpillar of the Poplar Hawk

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